CLAIMS

What is claimed is:

1. A pump assembly for an implantable prosthesis, comprising:
   a housing having a fluid passageway, the fluid passageway having an inlet and an outlet;
   a first flow valve located within the fluid passageway between the inlet and the outlet, and
   a supplemental biasing mechanism responsive to inadvertent pressure increases from the inlet to supplement a sealing capability of the first flow valve.

2. The pump assembly of claim 1, wherein the supplemental biasing mechanism further includes:
   a flexible flap in contact with the first flow valve when the first flow valve is in a closed position so that as fluid pressure from the inlet increases, the flexible flap is caused to seal more firmly against the first flow valve.

3. The pump assembly of claim 2 further comprising:
   a tapered passageway for receiving the first flow valve, wherein the flexible flap is part of the tapered passageway.

4. The pump assembly of claim 1, wherein the supplemental biasing mechanism further includes:
   a relief area in contact with the first flow valve when the first flow valve is in a closed position, so that as pressure from the inlet increases the relief area expands and further seals against the first flow valve.

5. The pump assembly of claim 1 wherein the supplemental biasing mechanism further includes:

a reservoir chamber disposed within the housing between the inlet and the first flow valve, wherein the reservoir chamber includes an outer wall; and

a portion of the first flow valve which extends into the reservoir chamber and is coupled to the outer wall, so that as fluid pressure within the reservoir chamber increases the outer wall is caused to flex, pulling the flow valve towards a closed position.

6. The pump assembly of claim 5 further including:
a spring coupling the flow valve to the outer wall.

7. The pump assembly of claim 6 wherein the spring is biased to maintain the flow valve in close proximity to the outer wall so that as the fluid pressure increases in the reservoir chamber, the spring will aid in the intentional unseating of the flow valve after a pump bulb compression.

8. The pump assembly of claim 5 further comprising:
a second flow valve, disposed between the first flow valve and the outlet.

9. The pump assembly of claim 5 wherein a tip of the first flow valve is directly connected the outer wall.

10. The pump assembly of claim 9 wherein the tip includes a T-shaped portion that is recessed behind at least one slot in the outer wall.

11. The pump assembly of claim 1, wherein the supplemental biasing mechanism includes:

a spring biasing the first flow valve into a sealed position, wherein the biasing force of the spring is selected to be strong enough to oppose pressures generated in an overpressurization situation within a reservoir and keep the second flow valve in the sealed position.

12. The pump assembly of claim 11, further including:

a face coupled to the first valve wherein the face has a large diameter compared to a diameter of the remainder of the first flow valve so that suction forces generated after a compression of a pump bulb act on a sufficient surface area of the face to overcome the biasing force of the spring.

13. The pump assembly of claim 12 further including:

a first lip seal located within the housing for selectively engaging an inner diameter portion of the face in a substantially fluid tight manner; and

a second lip seal located within the housing for selectively engaging an outer diameter portion of the face in a substantially fluid tight manner.

14. The pump assembly of claim 1, wherein the supplemental biasing mechanism further includes:

a front face on the first flow valve for selectively sealing and unsealing an opening to the inlet;

a rear section protruding from the first flow valve away from the opening, including an internal fluid passageway and a throughbore providing access into the internal fluid passageway and an outlet providing an egress from the internal fluid passageway;

a valve sleeve slidably engaging the rear section to selectively seal and unseal the throughbore so that as higher pressure levels are generated within the inlet, the front face of the first flow valve is caused to unseal the opening and the valve sleeve is caused to seal the throughbore, wherein the valve sleeve contacts a portion of the housing and prevents fluid flow to the outlet.

15. The pump assembly of claim 1, wherein the supplemental biasing mechanism further includes:

a conical lip seal selectively engageable with a stem portion of the first flow valve, wherein the stem portion includes a cylindrical portion and a groove

so that when the groove is positioned adjacent the conical lip seal fluid flow is permitted and when the cylindrical portion is positioned adjacent the conical lip seal fluid flow is prevented in direction from the inlet to the outlet.

16. The pump assembly of claim 15, comprising;

a face forming a portion of the first flow valve, wherein the face is selectively engageable with and biased towards a valve seat; and

an annulus spaced from the valve seat and allowing the face to be forcibly moved therethrough so that the face is retained on a first side or a second side of the annulus.

17. The pump assembly of claim 16, further comprising:

a spacer separating a rear portion of the face from the annulus when said face is positioned between the annulus and the valve seat so that fluid flow is permitted around the rear portion and through the annulus.

18. The pump assembly of claim 17 wherein the spacer is a plurality of bumps located on the annulus.

19. A penile prosthesis comprising:

a housing;

a fluid inlet to the housing, coupleable to a reservoir;

a fluid outlet from the housing, coupleable to an inflatable cylinder;

a fluid passageway coupling the inlet to the outlet;

a first check valve disposed within the fluid passageway and biased towards a closed position;

a second check valve disposed within the fluid passageway and biased towards a closed position;

a pump bulb in fluid communication with the fluid passageway between the first and second check valves; and

a reservoir chamber coupling the inlet to the fluid passageway, wherein a portion of the first check valve extends into the reservoir chamber and is coupled to an outer wall of the reservoir chamber so that as fluid pressure within the reservoir chamber increases, an expansion of the reservoir chamber occurs which urges the first check valve towards a closed position.

20. The prosthesis of claim 19 wherein a negative pressure generated by an expansion of the pump bulb is sufficient to open the first check valve.

21. The prosthesis of claim 19 further including a spring coupling the flow valve to the outer wall.

22. The prosthesis of claim 19 wherein the spring is biased to maintain the first check valve in close proximity to the outer wall so that as the fluid pressure increases in the reservoir chamber, the biasing of the spring will aid in the intentional unseating of the flow valve after a pump bulb compression.

23. A method of preventing inadvertent inflation of an implantable prosthetic comprising the steps of:
biasing a valve assembly such that an outlet is substantially closed; and
using inadvertent pressure increases from the inlet to supplement the biasing of the valve assembly.

24. The method of claim 23, wherein the step of using inadvertent pressure includes:
preventing fluid flow through the outlet by selectively varying fluid pressure within a bypass passageway having a first end which is in fluid communication with an inlet and a second end which is in fluid communication with a chamber.

25. The method of claim 24, further comprising the steps of:

displacing a flexible abutting wall disposed between the chamber and the valve assembly so that the abutting wall is caused to contact the valve assembly and urge the valve assembly into a closed position when the fluid pressure within the chamber exceeds a predetermined amount.

26. The method of claim 24, further comprising the steps of:

sliding a valve sleeve along a rear portion of the valve assembly to occlude a passageway leading through a portion of the valve assembly and to sealingly engage a portion of housing.

27. A method of preventing inadvertent inflation of an implantable prosthetic comprising the steps of:

biasing a valve assembly such that an outlet is substantially closed, wherein a biasing mechanism is sufficiently strong to oppose increased pressure levels generated during an overpressurization situation;

providing a sufficient surface area on the valve assembly so that vacuum forces generated after a compression of a pump bulb are sufficient to open the valve assembly.

28. A pressure lock out arrangement for an inflatable prosthesis comprising:

a housing having an inlet and an outlet;

a valve disposed between the inlet and the outlet, the valve being biased toward substantially sealing the outlet; and

a supplemental biasing mechanism responsive to inadvertent pressure increases from the inlet to increase the biasing of the valve toward at least substantially sealing the outlet.

29. The pressure lock out of claim 28 wherein the supplemental biasing mechanism further comprises:

a front face on the valve for selectively sealing and unsealing an opening to the inlet;

a rear section protruding from the valve and away from the opening, including an internal fluid passageway and a throughbore providing access into the internal fluid passageway and an outlet providing an egress from the internal fluid passageway;

a valve sleeve slidably engaging the rear section to selectively seal and unseal the throughbore so that as higher pressure levels are generated within the inlet, the front face of the valve is caused to unseal the opening and the valve sleeve is caused to seal the throughbore, wherein the valve sleeve contacts a portion of the housing and prevents fluid flow to the outlet.

30. The pressure lock out of claim 28 wherein the supplemental biasing mechanism further comprises:

a front face on the valve for selectively sealing and unsealing an opening to the inlet;

a rear section protruding from the valve and away from the opening, including an external fluid passageway having an outlet end;

a valve slidably engaging the rear section to selectively seal and unseal the outlet end so that as higher pressure levels are generated within the inlet, the front face of the valve is caused to unseal the opening and the valve sleeve is caused to seal the outlet end, wherein the valve sleeve contacts a portion of the housing and prevents fluid flow to the outlet end.

31. The pressure lock out of claim 28 wherein the supplemental biasing mechanism further comprises:

a reservoir chamber disposed within the housing between the inlet and the valve, wherein the reservoir chamber includes an outer wall; and

a portion of the flow valve which extends into the reservoir chamber and is coupled to the outer wall, so that as fluid pressure within the reservoir chamber increases the outer wall is caused to flex, pulling the flow valve towards a closed position.

32. The pressure lock out of claim 28 further including:
a spring coupling the flow valve to the outer wall.

33. The pressure lock out of claim 28, wherein the supplemental biasing mechanism further includes:
a conical lip seal selectively engageable with a stem portion of the valve, wherein the stem portion includes a cylindrical portion and a groove so that when the groove is positioned adjacent the conical lip seal fluid flow is permitted and when the cylindrical portion is positioned adjacent the conical lip seal fluid flow is prevented in a direction from the inlet to the outlet.

34. The pressure lock out of claim 33, comprising;
a face forming a portion of the valve, wherein the face is selectively engageable with and biased towards a valve seat; and
an annulus spaced from the valve seat and allowing the face to be forcibly moved therethrough so that the face is retained on a first side or a second side of the annulus.

35. The pressure lock out of claim 34, further comprising:
a spacer separating a rear portion of the face from the annulus when said face is positioned between the annulus and the valve seat so that fluid flow is permitted around the rear portion and through the annulus.

36. The pressure lock out of claim 35 wherein the spacer is a plurality of bumps located on the annulus.

37. A penile prosthesis comprising:
a housing;
a fluid inlet to the housing, coupleable to a reservoir;
a fluid outlet from the housing, coupleable to an inflatable cylinder;
a reservoir chamber disposed within the housing and fluidly coupled to the inlet;

a fluid passageway fluidly coupled to the reservoir chamber;

a first check valve disposed within the fluid passageway and biased towards a closed position;

a second check valve disposed within the fluid passageway and biased towards a closed position;

a pump bulb in fluid communication with the fluid passageway between the first and second check valves;

a spring biasing the first check valve into a sealed position, wherein the biasing force of the spring is selected to be strong enough to oppose pressures generated in an overpressurization situation and keep the second check valve in the sealed position; and

a face coupled to the first check valve wherein the face has a large diameter compared to a diameter of the remainder of the flow valve so that suction forces generated after a compression of a pump bulb act on a sufficient surface area of the face to overcome the biasing force of the spring.

38. The pump assembly of claim 37 further including:

a first lip seal located within the housing for selectively engaging an inner diameter portion of the face in a substantially fluid tight manner; and

a second lip seal located within the housing for selectively engaging an outer diameter portion of the face in a substantially fluid tight manner.

39. A penile prosthesis comprising:

a housing;

a fluid inlet to the housing, coupleable to a reservoir;

a fluid outlet from the housing, coupleable to an inflatable cylinder;

a reservoir chamber disposed within the housing and fluidly coupled to the inlet;

a fluid passageway fluidly coupled to the reservoir chamber;

a first check valve disposed within the fluid passageway and biased towards a closed position;

a second check valve disposed within the fluid passageway and biased towards a closed position;

a pump bulb in fluid communication with the fluid passageway between the first and second check valves;

a front face on the first check valve for selectively sealing and unsealing an opening to the fluid inlet;

a rear section protruding from the first check valve away from the opening, including an internal fluid passageway and a throughbore providing access into the internal fluid passageway and an outlet providing an egress from the internal fluid passageway; and

a valve sleeve slidably engaging the rear section to selectively seal and unseal the throughbore so that as higher pressure levels are generated within the inlet, front face of the first check valve is caused to unseal the opening and the valve sleeve is caused to seal the throughbore, wherein the valve sleeve contacts a portion of the housing and prevents fluid flow to the outlet.

40. A penile prosthesis comprising:

a housing;

a fluid inlet to the housing, coupleable to a reservoir;

a fluid outlet from the housing, coupleable to an inflatable cylinder;

a reservoir chamber disposed within the housing and fluidly coupled to the inlet;

a fluid passageway fluidly coupled to the reservoir chamber;

a second check valve disposed within the fluid passageway and biased towards a closed position;

a first check valve disposed within the fluid passageway and biased towards a closed position, the first check valve having a front face for selectively sealing and unsealing an opening to the fluid inlet and a rear stem section protruding from the first check valve away from the opening, including a cylindrical portion and a groove;

a pump bulb in fluid communication with the fluid passageway between the first and second check valves;

a conical lip seal integral with the housing and positioned so that the rear stem section is moveable therein so that when a cylindrical portion of the stem section is aligned with the conical lip seal, fluid flow in a direction from the inlet to the outlet is prevented and increased pressure levels within the inlet serves to further seal the conical lip seal against the cylindrical portion of the stem section, and when the groove is aligned with the conical lip seal, fluid flow is permitted; and

an annulus integral with the housing positioned so as to cooperate with the front face, allowing the front face to be forcibly move therethrough so that when the front face is on a first side of the annulus, the groove of the stem section is aligned with the conical lip seal and when the front face is on a second side of the annulus the cylindrical portion of the stem is aligned with the conical lip seal.

41. The penile prosthesis of claim 40, further comprising:

a spacer separating a rear portion of the front face from the annulus when said front face is on said first side so that fluid flow is permitted around the rear portion and through the annulus.

42. The penile prosthesis of claim 41 wherein the spacer is a plurality of bumps located on the annulus.

43. A method of preventing a vacuum lock from occurring in a penile prosthesis having a valve movable through an annulus so that when on a first side of the annulus operation of the prosthesis is permitted and when on a second side, spontaneous inflation is prevented, comprising:

positioning the valve on the first side of the annulus; and

providing a fluid path around the valve through the annulus when a rear face of the valve is proximate the annulus.

44. The method of claim 43 including the step of:

providing at least one spacer to prevent the rear face from sealing against he annulus.

45. The method of claim 44 including the step of providing at least one spacer that is integral with the annulus.

46. A pump assembly for an implantable prosthesis, comprising:

a housing having a fluid passageway, the fluid passageway having an inlet and an outlet;

a first flow valve located within the fluid passageway between the inlet and the outlet;

a supplemental biasing mechanism responsive to inadvertent pressure increases from the inlet to supplement the sealing capabilities of the first flow valve; and

a pump bulb in fluid communication with the fluid passageway.

47. The pump assembly of claim 46, further comprising:

a bar positioned within the housing and moveable between a first and a second position so that when the bar is moved from a first position to a second position the bar causes the first flow valve to move from a closed to an open position to deflate the implantable prosthesis.

48. The pump assembly of claim 47 further comprising:

a support member coupled to the housing, wherein the support member prevents the first flow valve from moving sideways relative to a major axis of the fluid passageway.

49. The pump assembly of claim 47, wherein the supplemental biasing mechanism further includes:

a relief area in contact with the first flow valve when the first flow valve is in a closed position, so that as pressure from the inlet increases the relief area further seals against the first flow valve.

50. The pump assembly of claim 47 wherein the supplemental biasing mechanism further includes:

a reservoir chamber disposed within the housing, wherein the reservoir chamber includes an outer wall; and

a portion of the first flow valve which extends into the reservoir chamber and is coupled to the outer wall, so that as fluid pressure within the reservoir chamber increases the outer wall is caused to flex, pulling the flow valve towards a closed position.

51. The pump assembly of claim 50 further including:

a spring coupling the flow valve to the outer wall.

52. The pump assembly of claim 51 wherein the spring is biased to maintain the flow valve in close proximity to the outer wall so that the spring will aid in the intentional unseating of the flow valve after a pump bulb compression.

53. The pump assembly of claim 51 further comprising:

a second flow valve, disposed between the first flow valve and the outlet.

54. The pump assembly of claim 46 wherein the first flow valve is made of a metallic material, and a plastic member is attached to a portion of the first flow valve covering said metallic material.

55. The pump assembly of claim 48, wherein the supplemental biasing mechanism further includes:

a front face on the first flow valve for selectively sealing and unsealing an opening to the inlet;

a rear section protruding from the first flow valve away from the opening, including an internal fluid passageway and a throughbore providing access into the

internal fluid passageway and an outlet providing an egress from the internal fluid passageway; and

a valve sleeve slidably engaging the rear section to selectively seal and unseal the throughbore so that as higher pressure levels are generated within the inlet, the front face of the first flow valve is caused to unseal the opening and the valve sleeve is caused to seal the throughbore, wherein the valve sleeve contacts a portion of the housing and prevents fluid flow to the outlet.

56. The pump assembly of claim 47, wherein the supplemental biasing mechanism further includes:

a conical lip seal selectively engageable with a stem portion of the first flow valve, wherein the stem portion includes a cylindrical portion and a groove so that when the groove is positioned adjacent the conical lip seal, fluid flow is permitted, and when the cylindrical portion is positioned adjacent the conical lip seal, fluid flow is prevented in a direction from the inlet to the outlet.

57. The pump assembly of claim 56, comprising;

a face forming a portion of the first flow valve, wherein the face is selectively engageable with and biased towards a valve seat; and

an annulus spaced from the valve seat and allowing the face to be forcibly moved therethrough so that the face is retained on a first side or a second side of the annulus.

58. The pump assembly of claim 57, further comprising:

a spacer separating a rear portion of the face from the annulus when said face is positioned between the annulus and the valve seat so that fluid flow is permitted around the rear portion and through the annulus.

59. The pump assembly of claim 58 wherein the spacer is a plurality of bumps located on the annulus.

60. A penile prosthesis comprising:

a housing;

a fluid inlet to the housing, coupleable to a reservoir;

a fluid outlet from the housing, coupleable to an inflatable cylinder;

a fluid passageway coupling the inlet to the outlet;

a first check valve disposed within the fluid passageway and biased towards a closed position;

a second check valve disposed within the fluid passageway and biased towards a closed position;

a pump bulb in fluid communication with the fluid passageway between the first and second check valves, wherein a negative pressure generated by an expansion of the pump bulb is sufficient to open the first check valve; and

a reservoir chamber coupling the inlet to the fluid passageway, wherein a portion of the first check valve extends into the reservoir chamber and is coupled to an outer wall of the reservoir chamber so that as fluid pressure within the reservoir chamber increases, an expansion of the reservoir chamber occurs which urges the first check valve towards a closed position.

61. The prosthesis of claim 60 further including:

a bar positioned within the housing and moveable between a first and a second position so that when the bar is moved from the first position to the second position the bar causes the first check valve to move from a closed position to an open position to deflate the implantable prosthesis, wherein the bar comprises a spring;

a support member coupled to the housing and mechanically linked to the first check valve to prevent transverse movement of first check valve relative to the major axis of the fluid passageway when the first check valve is moving from an open to a closed position; and

the first check valve is made of a metallic material with a plastic member disposed over a portion of the first check valve.

62. The prosthesis of claim 60 further including:

a spring coupling the flow valve to the outer wall;

the bar further comprising at least one rib extending across a bend such that a spring is created to afford the movement of the first check valve from a closed to an open position for deflation of the prosthesis.

63. The prosthesis of claim 60 wherein the spring is biased to maintain the first check valve in close proximity to the outer wall, and the biasing of the spring affording the intentional unseating of the flow valve after a pump bulb compression.

64. A method of preventing inadvertent inflation of an implantable prosthetic comprising:

biasing a valve assembly such that an outlet is substantially closed, wherein a biasing mechanism is sufficiently strong to oppose increased pressure levels generated during an overpressurization situation;

providing a support mechanism mechanically linked to the valve assembly to prevent sideward movement of a valve when moving between an open and a closed position; and

providing a sufficient surface area on the valve assembly so that vacuum forces generated after a compression of a pump bulb are sufficient to open the valve assembly.

65. A pressure lock out arrangement for an inflatable prosthesis comprising:

a housing having an inlet and an outlet;

a valve disposed between the inlet and the outlet, the valve being biased toward substantially sealing the outlet, the valve made of metallic material with a plastic member disposed over a portion of the valve; and

a supplemental biasing mechanism responsive to inadvertent pressure increases from the inlet to increase the biasing of the valve toward substantially sealing the outlet.

66. The pressure lock out of claim 65 wherein the supplemental biasing mechanism further comprises:

a front face on the valve for selectively sealing and unsealing an opening to the inlet;

a rear section protruding from the valve and away from the opening, including an internal fluid passageway and a throughbore providing access into the internal fluid passageway and an outlet providing an egress from the internal fluid passageway;

a valve sleeve slidably engaging the rear section to selectively seal and unseal the throughbore so that as higher pressure levels are generated within the inlet, the front face of the valve is caused to unseal the opening and the valve sleeve is caused to seal the throughbore, wherein the valve sleeve contacts a portion of the housing and prevents fluid flow to the outlet.

67. The pressure lock out of claim 65 wherein the supplemental biasing mechanism further comprises:

a front face on the valve for selectively sealing and unsealing an opening to the inlet;

a rear section protruding from the valve away from the opening, including an external fluid passageway having an outlet end;

a valve slidably engaging the rear section to selectively seal and unseal the outlet end so that as higher pressure levels are generated within the inlet, the front face of the valve is caused to unseal the opening and the valve sleeve is caused to seal the outlet end, wherein the valve sleeve contacts a portion of the housing and prevents fluid flow to the outlet end.

68. The pressure lock out of claim 65 wherein the supplemental biasing mechanism further comprises:

a reservoir chamber disposed within the housing between the inlet and the valve, wherein the reservoir chamber includes an outer wall; and

a portion of the flow valve which extends into the reservoir chamber and is coupled to the outer wall, so that as fluid pressure within the reservoir chamber increases the outer wall is caused to flex, pulling the flow valve towards a closed position.

69. The pressure lock out of claim 65, wherein the supplemental biasing mechanism further includes:

a conical lip seal selectively engageable with a stem portion of the valve, wherein the stem portion includes a cylindrical portion and a groove so that when the groove is positioned adjacent the conical lip seal fluid flow is permitted and when the cylindrical portion is positioned adjacent the conical lip seal fluid flow is prevented in direction from the inlet to the outlet.

70. The pressure lock out of claim 69, comprising;

a face forming a portion of the valve, wherein the face is selectively engageable with and biased towards a valve seat; and

an annulus spaced from the valve seat and allowing the face to be forcibly moved therethrough so that the face is retained on a first side or a second side of the annulus.

71. The pressure lock out of claim 70, further comprising:

a spacer separating a rear portion of the face from the annulus when said face is positioned between the annulus and the valve seat so that fluid flow is permitted around the rear portion and through the annulus.

72. The pressure lock out of claim 71 wherein the spacer is a plurality of bumps located on the annulus.

73. A penile prosthesis comprising:

a housing;

a fluid inlet to the housing, coupleable to a reservoir;

a fluid outlet from the housing, coupleable to an inflatable cylinder;

a reservoir chamber disposed within the housing and fluidly coupled to the inlet;

a fluid passageway fluidly coupled to the reservoir chamber;

a first check valve disposed within the fluid passageway and biased towards a closed position, the first check valve made of a metallic material with a plastic member disposed over a portion of the first check valve;

a second check valve disposed within the fluid passageway and biased towards a closed position;

a pump bulb in fluid communication with the fluid passageway between the first and second check valves;

a bar positioned within the housing and moveable between a first and a second position so that when the bar is moved from the first position to the second position the bar causes the first check valve to move from a closed position to an open position to deflate the implantable prosthesis, wherein the bar comprises a spring;

a support member coupled to the housing and mechanically linked to the first check valve to prevent transverse movement of first check valve relative to the major axis of the fluid passageway when the first check valve is moving from an open to a closed position,

a spring biasing the first check valve into a sealed position, wherein the biasing force of the spring is selected to be strong enough to oppose pressures generated in an overpressurization situation and keep the second check valve in the sealed position; and

a face coupled to the first check valve wherein the face has a large diameter compared to a diameter of the remainder of the flow valve so that suction forces generated after a compression of a pump bulb act on a sufficient surface area of the face to overcome the biasing force of the spring.

74. The prosthesis of claim 73 further including:

a first lip seal located within the housing for selectively engaging an inner diameter portion of the face in a substantially fluid tight manner; and

a second lip seal located within the housing for selectively engaging an outer diameter portion of the face in a substantially fluid tight manner.